CLAIMS

1. A process for synthesis of hydrogen cyanide, comprising:

reacting methane or methane-containing natural gas, ammonia and oxygen-enriched air or oxygen in the presence of a catalyst comprising platinum or a platinum alloy;

wherein oxygen and nitrogen are present in a molar ratio which satisfies the relationship

$$\frac{[O_2]}{[O_2 + N_2]} = 0.25 \text{ to } 1.0;$$

wherein methane and ammonia are present in a molar ratio of

$$\frac{[CH_4]}{[NH_3]} = 0.95 \text{ to } 1.05;$$

wherein a molar ratio of ammonia to the sum of oxygen and nitrogen obeys the following relationship:

$$Y = m \cdot X - a,$$

wherein

$$Y = \frac{[NH_3]}{[O_2 + N_2]}$$

$$X = \frac{[O_2]}{[O_2 + N_2]}$$

m = 1.25 to 1.40; and

a = 0.05 to 0.14.

2. The process according to Claim 1, wherein said molar ratio of oxygen and nitrogen is

$$\frac{[O_2]}{[O_2 + N_2]} = 0.25 \text{ to } 0.40.$$

3. The process according to Claim 1, wherein said molar ratio of methane and ammonia is

$$\frac{[CH_4]}{[NH_3]} = 0.98 \text{ to } 1.02.$$

4. The process according to Claim 1, wherein m = 1.25 to 1.33 and a = 0.07 to 0.11.

5. The process according to Claim 1, wherein the starting-gas mixture is preheated to at most 150°C.

6. The process according to Claim 1, wherein a volume flow for ammonia and methane or the methane-containing natural gas is calculated and controlled as a function of a molar ratio $X = O_2/(N_2 + O_2)$ using a process control system.

7. The process according to Claim 1, wherein said methane-containing natural gas contains at least 88 vol.% of methane.

8. The process according to Claim 1, wherein said process is performed in a conventional Andrussow-reactor.

9. A process for synthesis of hydrogen cyanide by the Andrussow method, comprising:

reacting a mixture of methane or methane-containing natural gas, ammonia and oxygen-enriched air or oxygen in the presence of a catalyst at an elevated temperature;

wherein a ratio

$$\frac{[O_2]}{[O_2 + N_2]} > 0.4 \text{ to } 1.0 \text{ (vol/vol); and}$$

wherein said reacting is performed in a conventional Andrussow reactor.

10. The process according to Claim 9, wherein a molar ratio

$$\frac{CH_4}{NH_3}$$

in said mixture mixture is 0.95 to 1.05 (mol/mol).

11. The process according to Claim 9, wherein an oxygen stream is intensively mixed with an air stream before adding methane or methane-containing natural gas and ammonia.

12. The process according to Claim 9, wherein a methane or natural-gas stream and an ammonia stream are mixed before adding into an air-oxygen or an oxygen stream.

13. The process according to Claim 9, wherein said mixture is preheated to at most 200°C.

14. The process according to Claim 9, wherein said mixture is preheated to at most 150°C.